Standard PS-7: The student will demonstrate an understanding of the nature and properties of mechanical and electromagnetic waves.

Supporting Content Web Sites

The Science of Stuff
A Freshman Scholars Seminar at the University of Wisconsin-Milwaukee
http://www.uwm.edu/~awschwab/specweb.htm
This site shows you how to build a spectroscope and use it to view spectra of light.
Indicator(s)
PS-7.5 and PS-7.6

Paul Falstad
http://www.falstad.com/mathphysics.html
This site contains java applet simulations of ripple tanks and many other applications that can simulate wave behavior.
Indicator(s)
PS-7.6 and PS-7.7

Physics lessons.com
DCMST Dearborn Public Schools
www.physicslessons.com
This site contains demonstrations and other lessons that the teacher can use in the classroom.
Indicator(s)
PS 7-6 and others

University of Aberdeen Department of Physics
http://www.abdn.ac.uk/physics/px2009/
This site contains applets of transverse and longitudinal waves and some good ones on refraction as well as other applets for wave characteristics.
Indicator(s)
7-2, 7-3, and 7-6

Optics Bench Applet
http://www.hazelwood.k12.mo.us/~grichert/optics/intro.html
This is an interactive applet for concave and convex lenses.
Indicator(s)
PS-7-6

StudyWorks On Line The Physics Classroom
http://www.physicsclassroom.com/Default2.html
This site contains tutorials and animations on wave phenomena.
Indicator(s)
PS 7-2, PS 7-3, PS 7-5, and PS 7-6

W. Bauer, 1999
http://www.lon-capa.org/~mmp/applist/doppler/d.htm
This site has a good interactive java applet on the Doppler Effect.
Indicator(s)
PS 7-7

NASA
http://imagers.gsfc.nasa.gov/ems/ems.html
This site shows the electromagnetic spectrum with its relative wavelengths and discusses electromagnetic radiation.
Indicator(s)
PS 7-5

Suggested Literature

Waves: From Surfing to Tsunami. Drew Kampion. Illustrated by Jeff Peterson and with prints and photographs. Gibbs Smith, Publisher. 80pp. Trade ISBN 1-58685-212-4, $19.95. (E) What causes waves to form? What makes them move? The melding of technical writing and storytelling, incredible photographs, and original artwork makes this book about wave formation and movement both interesting and easy to understand. This detailed analysis of wave action and influences also includes a section about tsunamis. Glossary, Web Resources, Photo Credits. NJP (V)

Suggested Streamline Video Resources

Science Investigations Physical Science: Investigating Sound and Light. Discovery Channel School (2004).
Segment and time
Properties of Waves (10:16)
Sound and Navigation (09:39)
Submarines and Sonar (02:15)
Echolocation and Dolphins (03:38)
Echolocation and Bats (03:45)

Description
The Properties of Waves segment introduces waves and using tsunamis as an example discusses waves and the energy of the waves moving with the water remaining in place. The last four segments demonstrate uses for sound reflection.
Indicator(s)
PS 7-1 and PS 7-6

Elements of Physics: Waves: Sound and Electromagnetism. United Learning (2006)
Segment and Time
The Nature of Waves (02:20)
Description
This segment introduces waves and some characteristics of waves.
Indicators
PS 7-3
Segment and Time
Sound Waves (02:55)
Description
This segment introduces sound waves.
Indicator(s)
PS (7-2)
Segment and Time
Electromagnetic Waves (03:07)
Description
This segment is an introduction to electromagnetic waves.
Indicator(s)
PS 7-5
Segment and Time
Wave Interference (06:40)
Description
This segment includes a brief discussion several characteristics of waves including interference and the Doppler Effect.
Indicators
PS 7-6 and PS7-7

Elements of Physics: Light: Optics and Electricity. United Learning
Segment and Time
Optics (02:07)
Description
This segment gives an introduction to reflection and the law of reflection.
Indicators
PS 7-6

Elements of Physics: Light: Optics and Electricity. United Learning
Segment and Time
What is Light? (02:16)
Description
This segment introduces the electromagnetic spectrum.
Indicators
PS-7.5

Elements of Physics: Light: Optics and Electricity. United Learning
Segment and Time
Putting the Electromagnetic Spectrum to Use (03:29)
Description
This segment describes some uses of electromagnetic waves.
Indicators
PS 7-5

Career Connections

Optical Engineer, Electro-Optical Engineer, Opto-Mechanical Engineer, Physics Technician, Design Engineer, Software Engineer, Materials Engineer, Laser Engineer/Scientist, Ophthalmologist, Optometrist, Optician, Acoustical Engineer, Physicist

Web sites
http://www.optics.arizona.edu/Employment/NationalOpenings.htm